

Vitamin a Supplementation Among Children in the Slums of Dehradun

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Abstract

Vitamin A is an essential micronutrient, that supports the immune system and it aids in the maintenance of the body's epithelial tissue. Insufficient intake of vitamin A increases a child's risk of illness and is the main cause of preventable blindness in children. Due to a weakened immune system, slower growth and development, and visual abnormalities such as xerophthalmia, total blindness, and night blindness, the prevalence of vitamin A deficiency (VAD) increases morbidity and mortality. Providing two doses of vitamin A to children between six months and five years each year helps lower the morbidity and mortality of children affected by vitamin A deficiency. The study was conducted in the 5 slums of Dehradun viz. Khurbura, Azaad Colony, Bindal Basti, Idgah Prakash Nagar, and New Patel Nagar. A total of 1500 children (boys 805, girls 695) aged 6 months to 5 years were covered in the study and supplemented with the first dose of Vitamin A.

Keywords: Vitamin A supplementation, vitamin A deficiency, visual impairments, children, Dehradun

Introduction

Uttarakhand is divided into 2 regions one is Kumaun second is Garhwal. Dehradun is the capital city of Uttarakhand state located in the foothill of Himalaya with a population of approximately 578420. At present, there are about 128 slums with 0.16 million inhabitants covering an area of approximately 2.88 km² out of the total 34.00 km² in the Dehradun city. The slums are spread throughout a number of crucial regions of the city and have a population of between 250 and 5,000 people. However, most of the slums are located on encroached land along the river banks of Bindal and Rispana and have poorer socio-economic status in comparison with other slums. The impoverished areas can be found around the main roads or beside the flooding areas of the Bindal and Rispana rivers. They are more vulnerable section of society in all kinds of disaster flood, heat wave, etc (Census of India, 2011).

Profile of Khurbura (Slum), Dehradun

Khurbura is the largest community; this community is a home to about 9,500 people from nearby hamlets, with the majority of them being from scheduled castes and backward classes. Khurbura is situated in the Sahaspur tehsil of Dehradun. It is located 17 kilometers away from the main town. The majority of the population lives along the side of the River. This is very much unhygienic place to live. Khurbura is an area which have their small sub locality namely Shiv colony, Shivaji Marg, Chabil Bagh, Kumhar Mohalla, Jatiya Mohalla and Rishi Ashram. This 5 locality of Khurbura have the population of 4500. Among these areas of Khurbura there are total of 300 young girls of age 16-25 living their life. In

this Target community of Dehradun, children and youth especially girls face discrimination, neglect and physical & sexual abuse.

Table 1: POPULATION MATRIX OF KHURBURA, DEHRADUN

Number of Males	1848
Number of Females	1648
Number of Young girls (15-25 years)	1800
Number of children 5-15 years	2000
Infant below 5 years	2204
Total Population	9,500

PROFILE OF THE AREA, AZAAD COLONY (Slum), DEHRADUN, UTTARAKHAND

The Azaad Colony slum area (Malin Basti) is situated near the river. The river flows through Dehradun in Uttarakhand, India and is fed by a number of springs at the base of Mussoorie Ridge. The river running down between the Malin Basti apart of slum is filled with the uncollected waste. Home to hundreds of thousands of people lack of proper sanitation and children carrying waste in large sacks on their heads are visible. The river is got contaminated with hazardous pollutants and chemicals. In 2019 Government of Uttarakhand initiated a plan to revive the water body. At the bank of this river slums are formed where population lives in Jhuggi, rented house (Pakka) or own house (pakka or kacha). There is no cleanliness found along these houses, this is due to the lack of education and loss of interest in livelihood.

Table 2: POPULATION MATRIX OF AZAAD SLUM, DEHRADUN

Number of Males	146
Number of Females	112
Number of Young girls (15-25 years)	35
Number of children 5-15 years	156
Infant below 5 years	154
Total Population	603

The people who lives along the river in this Malin Basti, they are generally Biharis, muslims, and the Punjabi. Majority population in this area is of Bihar. The people of this community lives at both the sides of the river even they are not having proper way to get into the Basti they have to cross the river to come into the city. Children and People of slum are living in a pollutant environment and unhygienic conditions and deal with the different type of waste.

PROFILE OF THE AREA BINDAL BRIDGE, DEHRADUN UTTARAKHAND

The Bindal bridge slum area (Malin Basti) is situated near the river Bindal. The Bindal River flows through Dehradun in Uttarakhand, India and is fed by a number of springs at the base of Mussorie Ridge. The river running down between the Malin Basti apart of Bindal slum is filled with the uncollected waste. Home to hundreds of thousands of people lack of proper sanitation and children carrying waste in large sacks on their heads are visible. The Bindal river is got contaminated with hazardous pollutants and chemicals. In 2019 Government of Uttarakhand initiated a plan to revive the

water body. At the bank of this Bindal river slums are formed where population leaves in Jhuggi, rented house (Pakka) or own house (pakka OR kacha). There is no cleanliness found along these houses, this is due to the lack of education and loss of interest in livelihood. The people who lives along the river in this Malin Basti, they are generally the migrants from Bihar and they all Sahani’s according to them fisherman in their native place.

Table 3: POPULATION MATRIX OF BINDAL BRIDGE SLUM

Number of Males	231
Number of Females	196
Number of children(5-15 years)	225
Infant below 5 years	113
Number of Girls (15-25 years)	127
Total Population	892

Every child in this slum area community is get vaccinated through the government Anganwadi’s. People in the Bindal slum are living in a pollutant environment and unhygienic conditions and deal with the different type of waste.

PROFILE OF THE AREA NEW PATEL NAGAR (slum), DEHRADUN UTTARAKHAND

The New Patel Nagar area (Malin Basti) is situated near the river. Total population of this slum is 9000. At the bank of this river slums are formed where population lives in Jhuggi, rented house (pakka) or own house (pakka or kacha). Children and People of slum are living in a pollutant environment and unhygienic conditions and deal with the different type of waste.

Table 4: POPULATION MATRIX OF NEW PATEL NAGAR SLUMS

Number of Males	4500
Number of Females	3600
Number of children(5-15 years)	225
Infant below years	635
Number of Girls (15-25 years)	127
Total Population	9087

PROFILE OF THE AREA, IDGAH PRAKASH NAGAR (slum) DEHRADUN UTTARAKHAND

New Patel Nagar is situated near the river. The majority of the population lives along the side of the River. This is very much unhygienic place to live. At the bank of this Bindal river slums are formed where population leaves in Jhuggi, rented house (pakka) or own house (pakka or kacha). There is no cleanliness found along these houses, this is due to the lack of education and loss of interest in livelihood.

TABLE 5: POPULATION MATRIX OF IDGAH PRAKASH NAGAR SLUM

Number of Males	260
Number of Females	180

Number of children(5-15 years)	55
Infant below 5 years	35
Number of Girls (15-25 years)	42
Total Population	572

Vitamin A and its importance

Vitamin A is an important micronutrient and consists of lipid soluble compounds (retinoic acids). Vitamin A is required for normal functioning of the visual system, maintenance of cell function for growth, epithelial integrity, and production of red blood cells, immunity, and reproduction. Different forms of vitamin A include β carotene, found in plants, and preformed vitamin A, found in animal sources (India Human Development Report, 2011; Awasthi and Awasthi, 2020). Vitamin A is an essential micronutrient that cannot be synthesized in the body so it must be obtained through diet (Tang, 2010).

Vitamin A Deficiency (VAD) in children and importance of Vitamin A supplementation for children

Infants and children have increased vitamin A requirement to promote rapid growth and to help combat infections. Inadequate intakes of vitamin A at this age could lead to vitamin A deficiency; severe deficiency may cause visual impairment (night blindness). Vitamin A deficiency increases vulnerability to a range of illnesses including diarrhea, measles, and respiratory infections among children (India Human Development Report, 2011; WHO, 2011; Imbad *et al.*, 2017). In children 24–59 months of age, the prevalence of night blindness is 1 per cent or higher. In instances when infants and children 6–59 months of age have a 20 percent or higher prevalence of vitamin A deficiency (serum retinol 0.70 $\mu\text{mol/l}$ or lower), high-dose vitamin A supplementation is strongly recommended (WHO, 2024). Inadequate intake of vitamin A is one of the main causes of preventable blindness in children and a significant cause of disease and mortality. Delivering children two doses of vitamin A supplements annually has been found to reduce the risk of childhood blindness and raise survival rates by up to 24 per cent (Vitamin Angels, 2024). Vitamin A helps in boost immunity and protects children under five from preventable diseases and blindness (Nutrition International, 2024).

Fruits and vegetable has low levels of provitamin A carotenoid, so it is difficult for children to fulfill their daily requirements through plant food sources alone. Consequently, vitamin A deficiency is common among children whose families cannot afford eggs and dairy products. So supplementation of Vitamin A is necessary for children. Vitamin A deficiency puts children at greater risk of preventable child blindness. The prevalence of vitamin A deficiency promotes to increased weakened immune system, slowed growth and development, visual system disorders, including, xerophthalmia, irreversible blindness and night blindness (Nutrition International, 2024; WHO 2024).

Supplementing with vitamin A may enhance intestinal integrity and reduce the intensity of certain diarrheal episodes (Villamor and Fawzi, 2005; Stephensen, 2001). Vitamin A may help improve vulnerability to the severity of various illnesses as part of its function in both adaptive and innate immunity (Ross, 2007). Numerous nations have effectively implemented policies that incorporate vitamin A supplementation into routine health visits and vaccination programs for newborns and children. From the age of nine months to three years, the Indian government has suggested that children

receive a vitamin A supplement every six months (India Human Development Report, 2011; WHO, 2011; WHO, 2024).

Vitamin A deficiency is a major public health and nutritional problem in low- and middle-income countries, 190 million children under five years of age (Imdad *et al.*, 2017). It has been estimated that 5.7 million children in India suffer from eye signs of Vitamin A deficiency. India accounts for around 15 million of the 37 million blind persons worldwide (India Human Development Report, 2011). Though one of the main causes of xerophthalmia a visual impairments poor intake of vitamin A rich food, it is also associated with poverty, ignorance, faulty feeding habits among entire population but young children in particular (Khan and Mahmood, 2012; UNICEF, 2020). Vitamin A is a crucial component for maintaining good health lifelong. Since breast milk is a natural source of vitamin A, promoting breastfeeding is best way to protect children from Vitamin A deficiency (Yadav and Dubey, 2017).

Vitamin A is vital to child health and immune function; hence, in settings where vitamin A deficiency is a public health problem, vitamin A supplementation is recommended in infants and children aged 6-59 months as a public health intervention to reduce incidences of eye system disorders. Supplementation with vitamin A is a safe, cost-effective when the recommended age-specific vitamin A dose is administered and efficient means for eliminating deficiency of this vitamin and improving child survival. Supplementing children under five with two doses of vitamin A per year reduces incidence of diarrhoea, and incrementally reduces the odds of child stunting (WHO, 2011).

Methodology

The study was carried out in Khurbura, Azaad colony, Bindal Basti, Idgah Prakash Nagar, and New Patel Nagar slums of Dehradun. Slum camps were set up for Vitamin A supplementation of all children below 5 years with the first dose of Vitamin A. After that those children who were left in camps door to door service was provided.

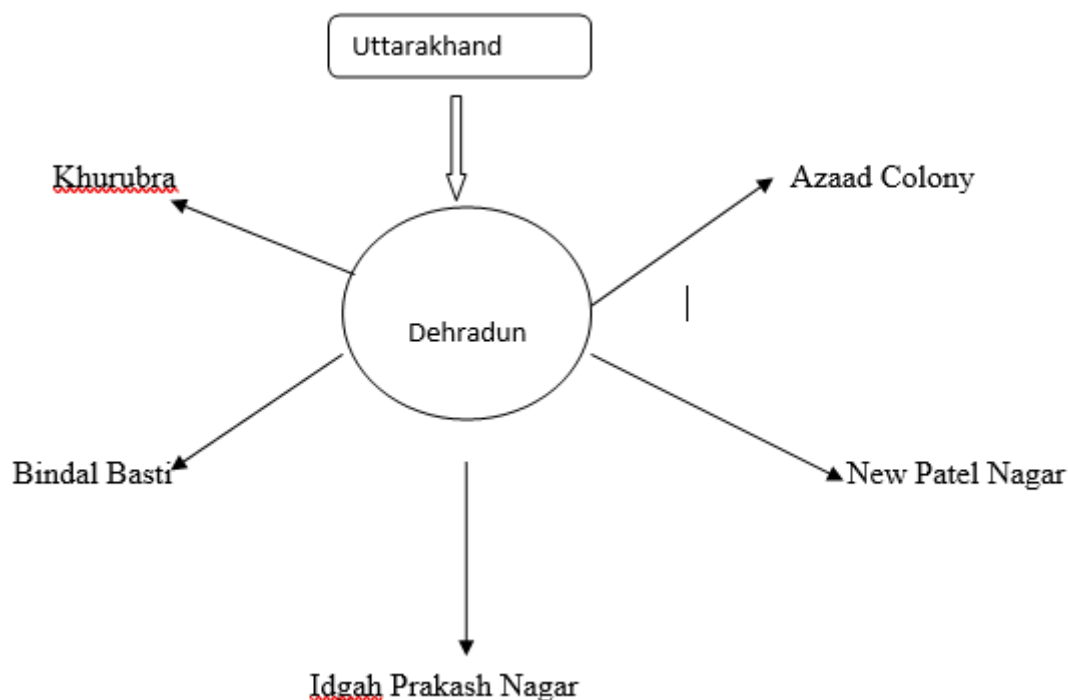


Fig.1: Schematic representation of the selected Slums in Dehradun for Vitamin A supplementation

Results and Discussion

Table: 6 Details of children supplemented with Vitamin A 1st dose in the selected slums of Dehradun

S.No.	Slum Name	Vitamin A
1.	Khurbura	Blue Capsule =64 Red Capsule =571
2.	Azaad Colony	Blue Capsule =08 Red Capsule =146
3.	Bindal Basti	Blue Capsule= 10 Red Capsule = 103
4.	New Patel Nagar	Blue Capsule = 60 Red Capsule = 503
5.	Idgah Prakash Nagar	Blue Capsule = 01 Red Capsule = 34
		Male = 805 Female = 695 Total = 1500

Characteristics of Vitamin A Supplement Capsules

Blue Capsule -1 lakh micro ltr (age 6 months to 1 months)

Each soft gelatin capsule contains:

Vitamin A Supplement Capsule IP (as palmitate): 1,00,000 IU (equivalent to Retinol 30 mg)

Vitamin E IP: 20 IU

Formulated in accordance with: World Health Organization (WHO)

United Nations Children’s Fund (UNICEF)

Red Capsule – 2 lakhs micro ltr (12 months to 5 years)

Each soft gelatin capsule contains:

Vitamin A Supplement Capsule IP (as palmitate): 2,00,000 IU (equivalent to Retinol 30 mg)

Vitamin E IP: 20 IU

Formulated in accordance with: World Health Organization (WHO)

United Nations Children’s Fund (UNICEF)

Table 6 represents the details of children supplemented with Vitamin A in selected slums (Khurbura, Aazad Calony, Bindal Basti, New Patel Nagar, and Idgah Prakash Nagar) of Dehradun. We worked as volunteers at the Bal Umang Drishya Sanstha (BUDS). We got Vitamin A through the donation of Vitamin Angels, a public health non-profit organization working to address malnutrition by improving maternal and child nutrition in underserved communities worldwide. We had delivered a total of 1500 vitamin A capsules (blue capsule and red capsule) to the children below 5 years old in selected slums of Dehradun. Children were supplemented with Vitamin A (blue capsule) in selected slums; Khurbura (64), Azad Calony (08), Bindal Basti (10), New Patel Nagar (60), and Idgah Prakash Nagar (01). Children

were supplemented with Vitamin A (red capsule) in selected slums; Khurbura (571), Azad Colony (146), Bindal Basti (103), New Patel Nagar (503), and Idgah Prakash Nagar (34).

Conclusion

Vitamin A is an important micronutrient for child health and immune function. Infants and children have increased vitamin A requirement to promote rapid growth visual function and to help combat infections. Inadequate intakes of vitamin A at this age could lead to vitamin A deficiency; severe deficiency may cause visual impairment (night blindness). It also increases vulnerability to a range of illnesses including diarrhea, measles, and respiratory infections, weakened immune system, slowed growth and development. Vitamin A deficiency has been recognized as a major controllable public health and nutritional problem. Vitamin A supplementation is a safe, economical, and effective way to eradicate vitamin A deficiency and increase the survival rate of children. Supplementing children under five with two doses of vitamin A per year reduces incidence of diarrhea, and reduces child stunting.

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